

# SM Project P-2210

## Release Protocol Analysis

Presented to:

Roanoke River Basin Advisory Commission

18 October 2006

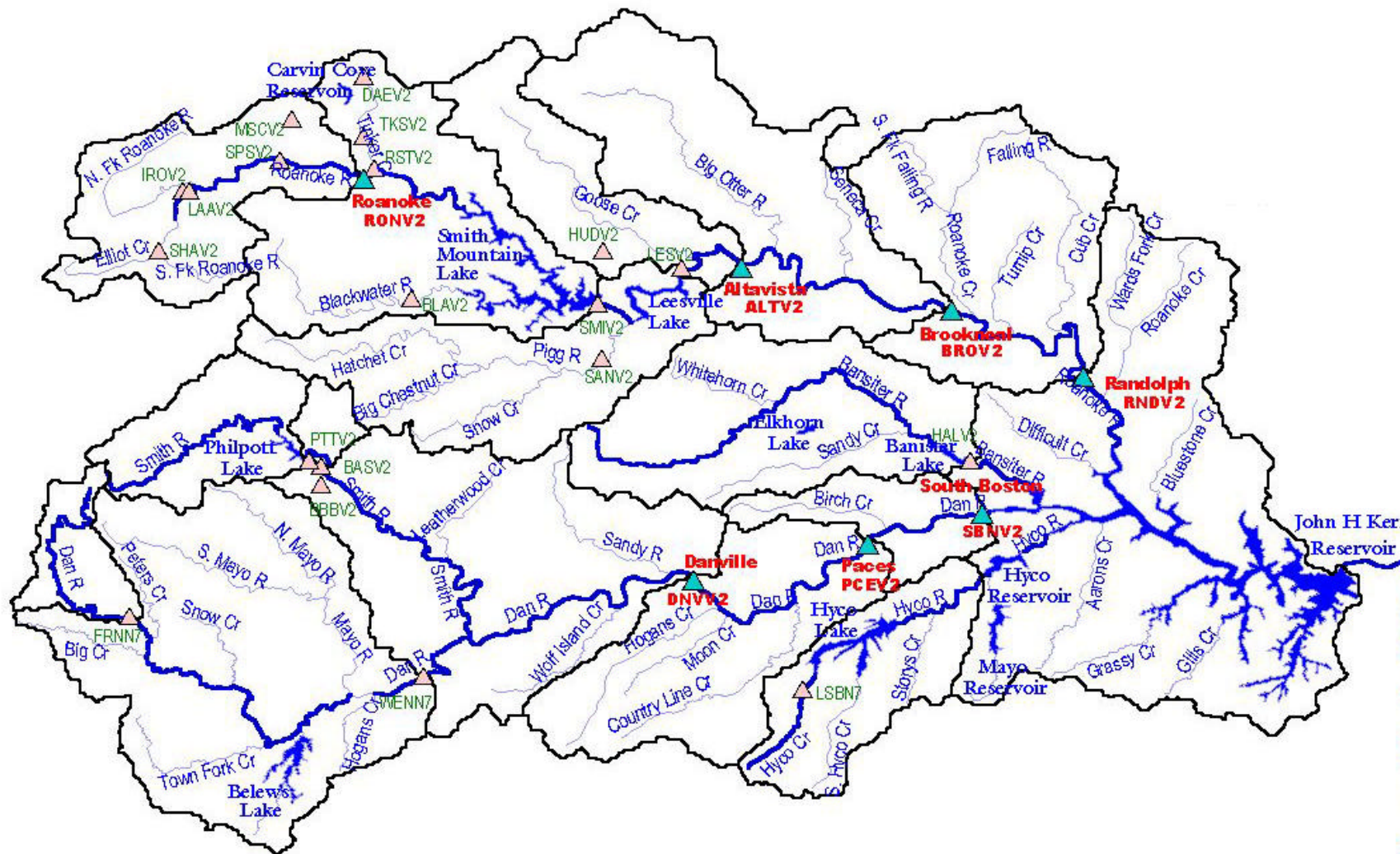
B. Brush J. Lindsey B. Reidenbach

# Protocol Evaluation Committee

*Report Published 15 January 2004*

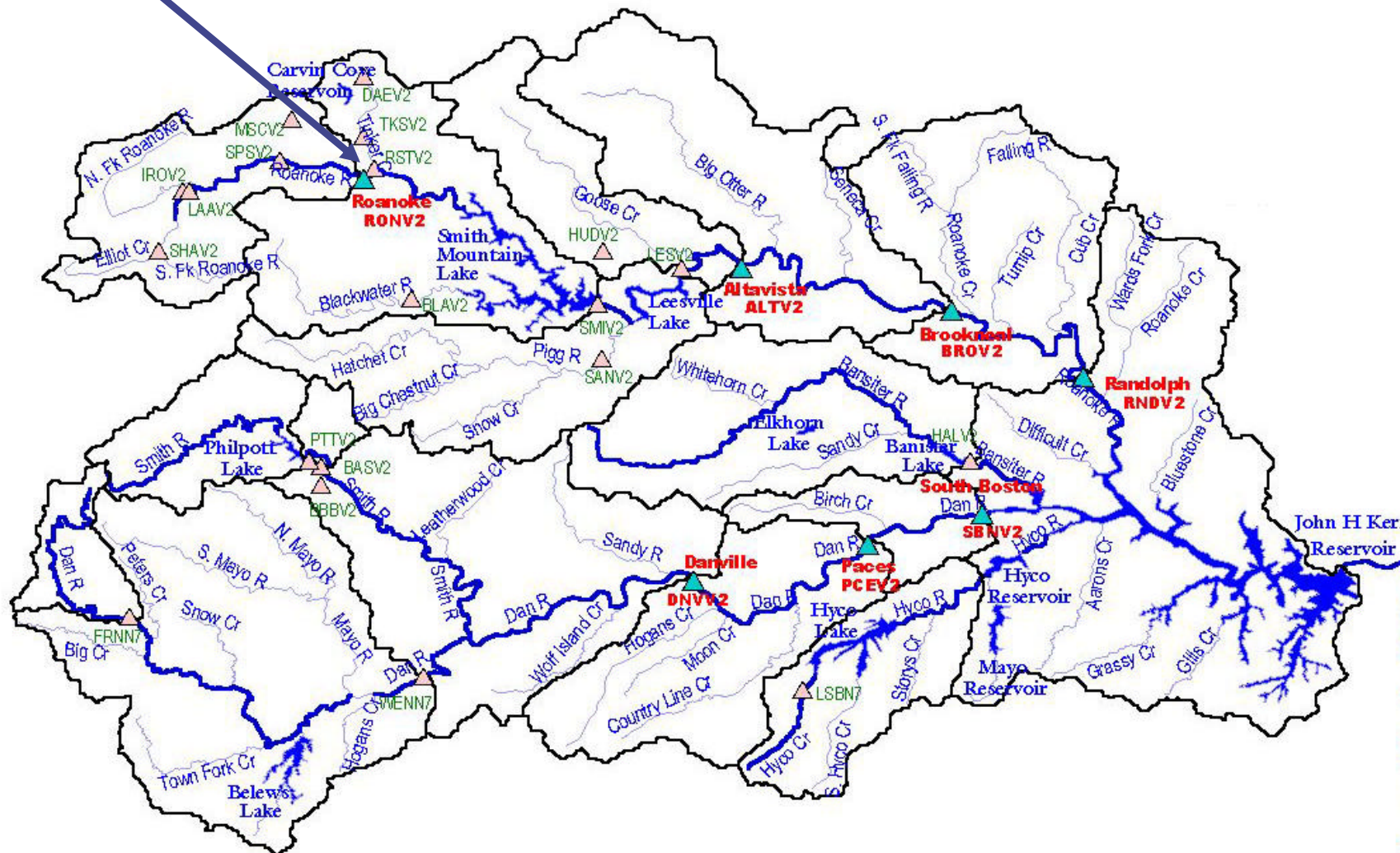
## ◆ Membership

J. Johnson Eller, esq.	Chairman	Altavista/SML
Bill Brush	member	SML Bedford
J.T. Davis	member	Friends of Staunton River
John Lindsey	member	SML Pittsylvania
Shelton Miles	member	Citizens for Preservation of the River
Bill Reidenbach	member	SML Franklin
Teresa Rogers	member	Reservoir Mgr, AEP



# Roanoke Basin

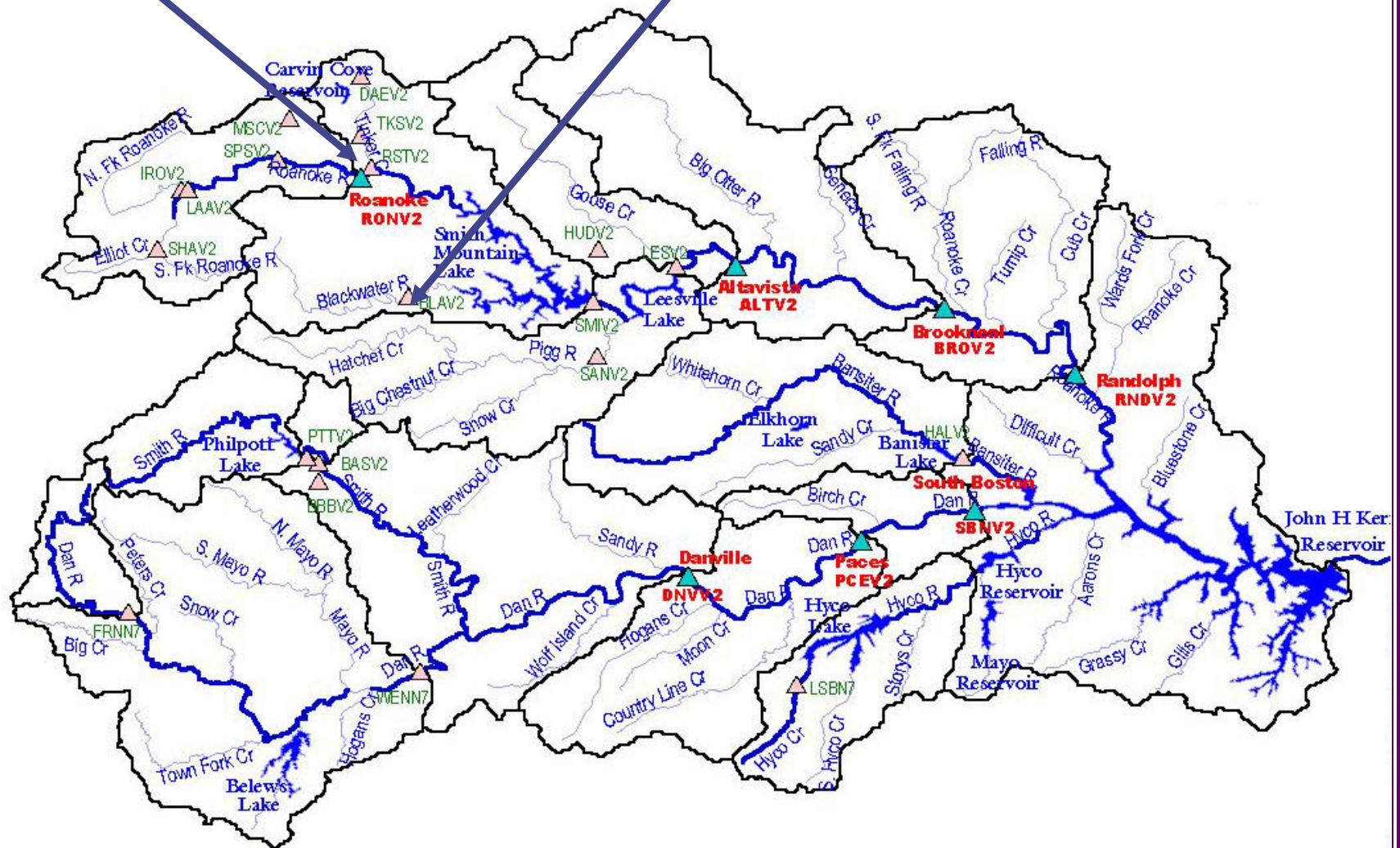
# Roanoke River @ Roanoke



## Roanoke Basin



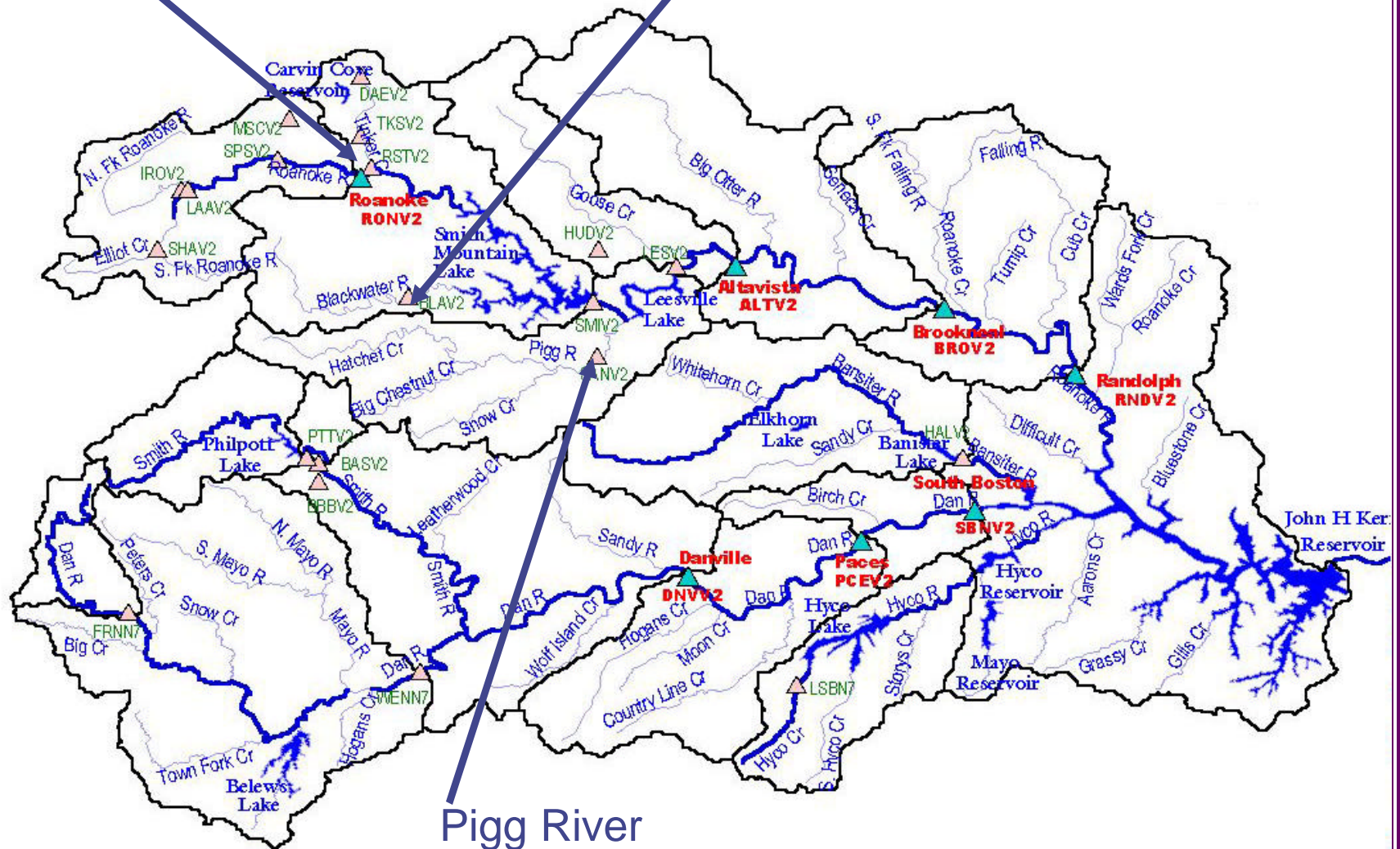
# Roanoke River @ Roanoke      Blackwater River



## Roanoke Basin

Roanoke River @ Roanoke

Blackwater River

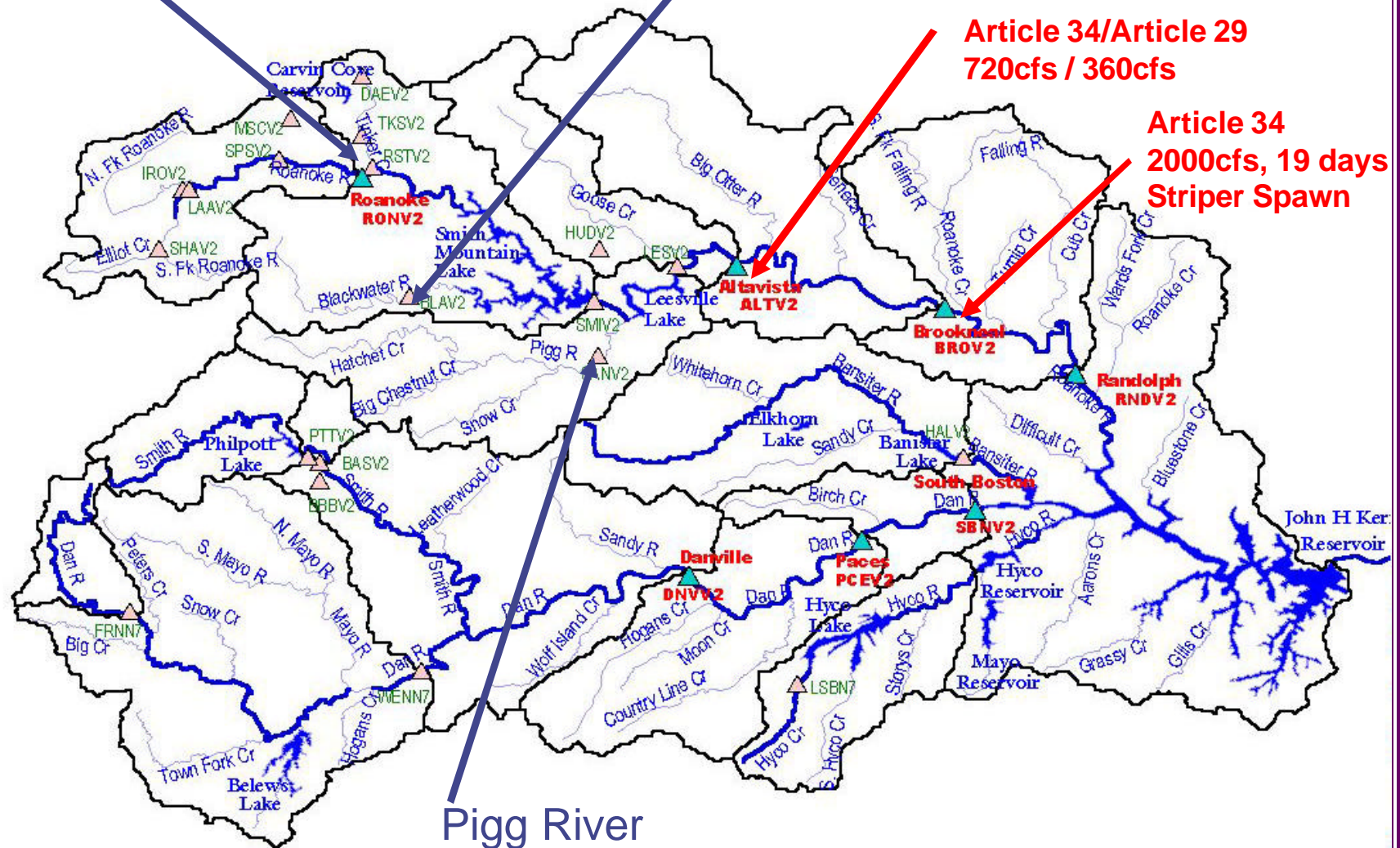


Roanoke Basin



Roanoke River @ Roanoke

Blackwater River



Roanoke Basin

# Project Familiarization

- ◆ Main Inflows = Roanoke R. Blackwater R. & Pigg R.(LL)
- ◆ Project Size = 23,870 acres, 389,750,381,100 gallons
  - 20,600 acres (SML) + 3,270 acres Leesville Lake (LL)



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3. SML Adj. = 795ft SML + 600ft LL = Full Pond
4. SML Actual = SML level only
5. Discharge Protocol is for Leesville Dam
  - 650cfs Average / Week = 12,603,181,500 gallons/mo
  - 1.0 ft Lake Level = 400cfs for one Month / 7,755,804,000 gal/mo
6. No Loss of Water for Power Generation
  - 2 ft. Pumped Storage Power Pool (LL)

# Basic Volumetric Model

## Inflows

- Roanoke R. + Pigg R.  
+ Blackwater R.
- (\*) Adj. Factor (1.6x)
- (-) Evaporation

**SML Project  
(SML + LL)**

**Leesville  
Release**  
Average Weekly  
(650cfs)

**Altavista Flow**  
(720cfs / 360cfs)

**Goose Creek  
Side Flow**  
\* Adjustment Factor

**Big Otter  
Side Flow**  
\* Adjustment Factor

**Brookneal Flow**  
1267cfs Striper Spawn  
(30 days)

# Volumetric Analysis Data Sources

## *Historical Data to Evaluate Release Protocol Performance*

### ◆ USGS Mean Monthly Flows

- Inflows -- Roanoke R. Blackwater R. & Pigg R.
- Side-Flows -- Goose Creek, Big Otter
- Main Down-Stream Flows -- Altavista, Brookneal

### ◆ ACOE Historical Mean Monthly Evaporation

- Philpott Lake

### ◆ AEP Hourly Data from 1998 thru 2002

- Leesville Release
- SML Adjusted Level

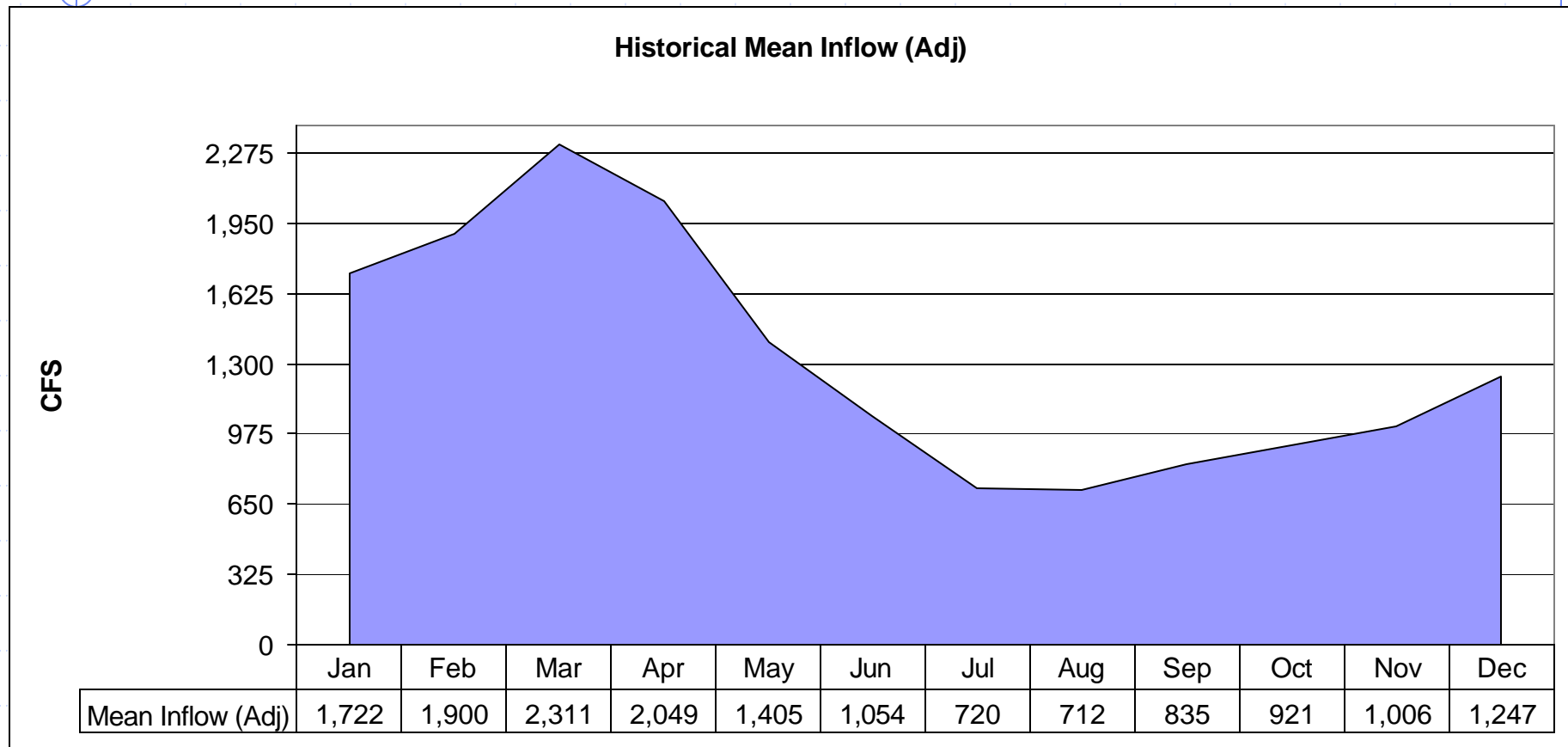


# The Need for a Better Protocol

Balance

# Historical Monthly Average Net Inflows

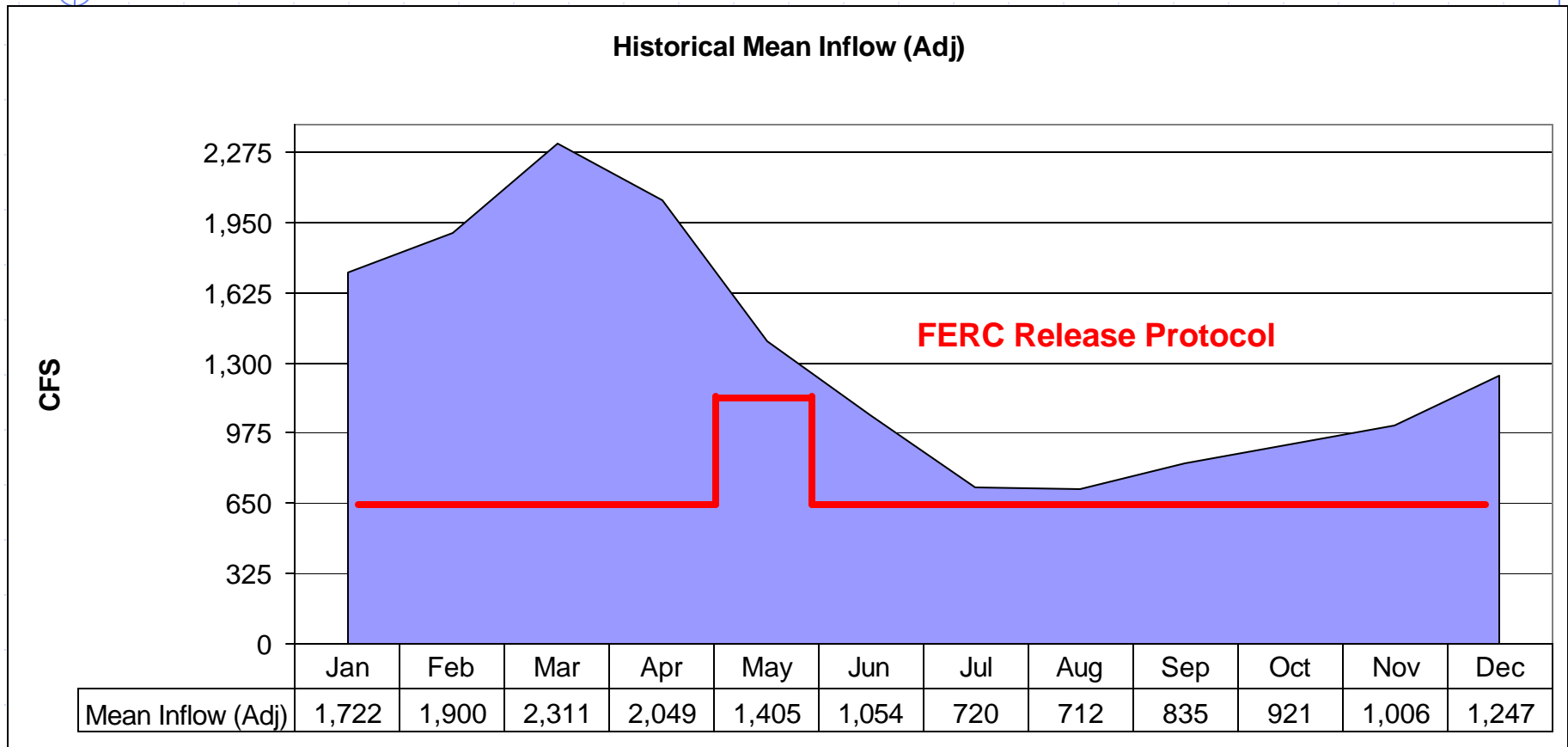
Since Data Inception  
(Factor 1.6 less Evaporation)



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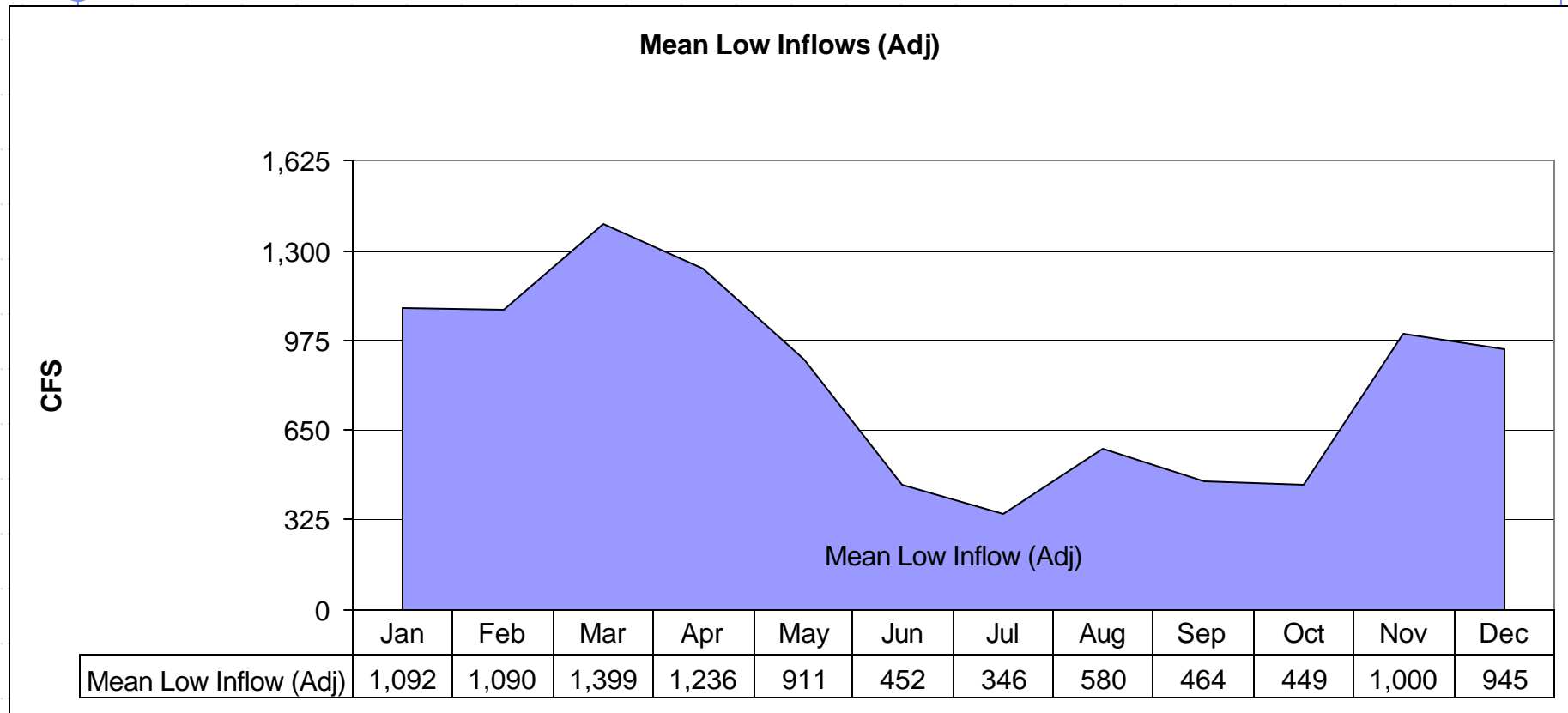
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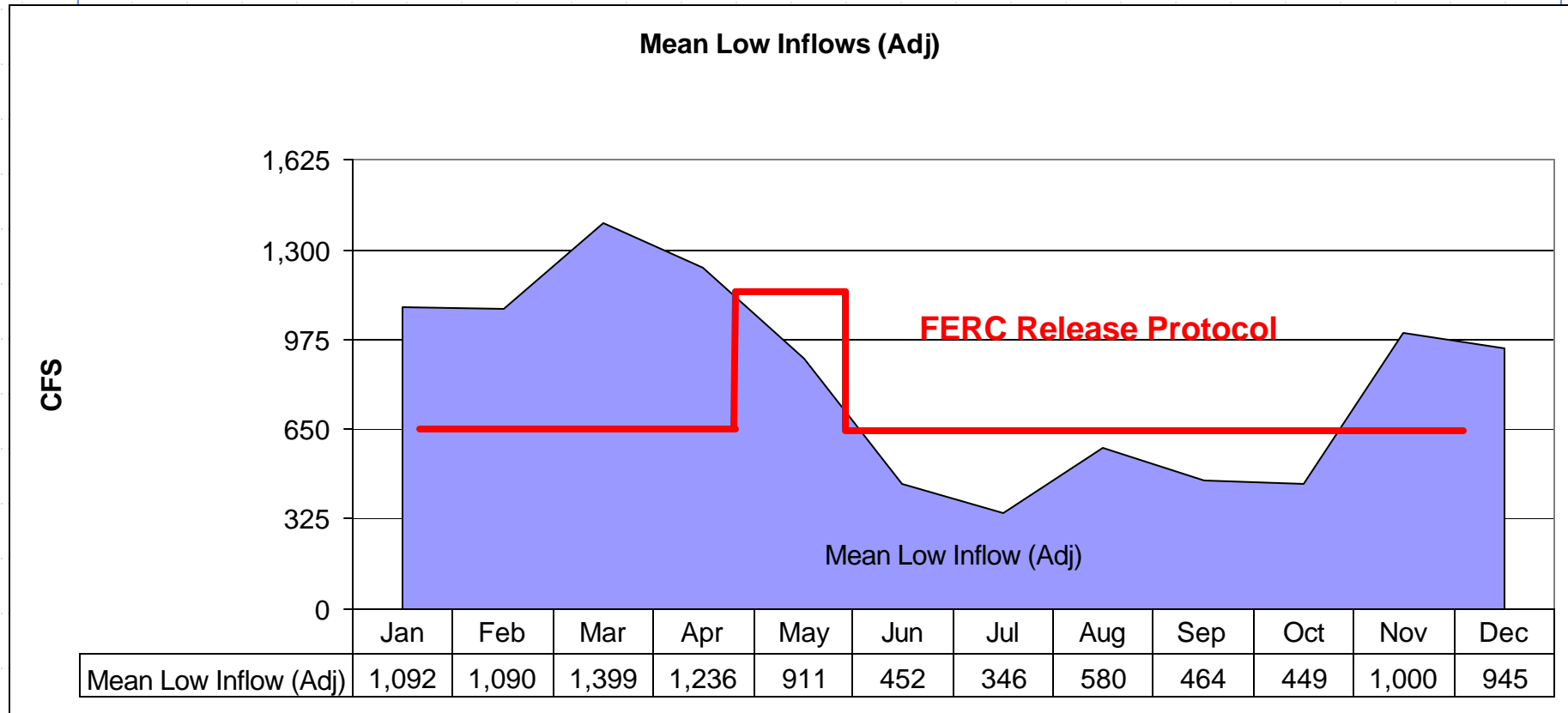
## Expected Low Flow Conditions 1967 - 2002 Data (Factor 1.6 less Evaporation)





# Historical Monthly Average Inflows

Expected Low Flow Conditions 1967 - 2002 Data  
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# Protocol Performance Comparison

Under Expected Low Flow Conditions



# Graduated Step Release Protocol

## *Conserve Water Resource to Meet Required Needs*

- ◆ **Winter Objective: Restore Full Pond** (15 October to 1 March)
  - **Minimum Release 350cfs (If Required)**

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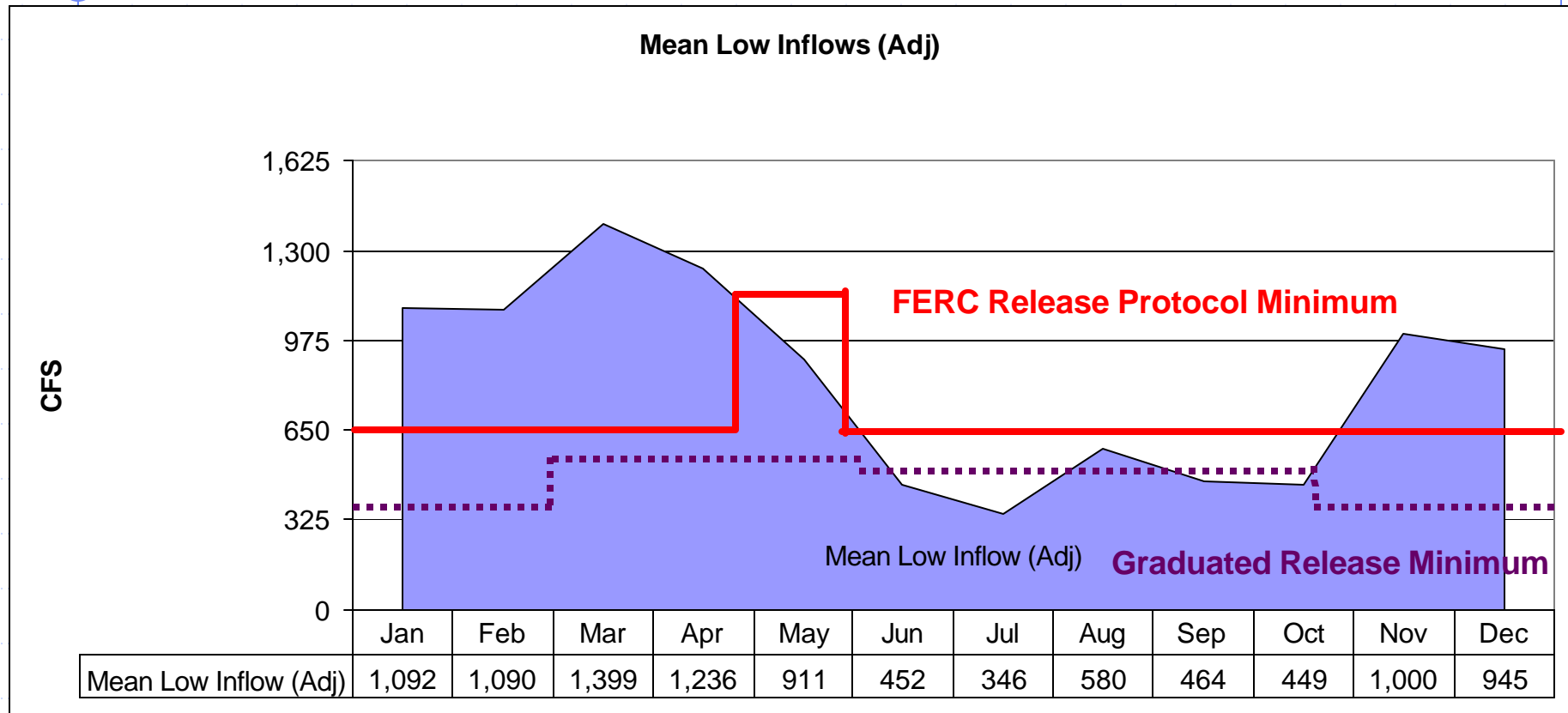
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- ◆ **Late Spring Objective: Support Striper Spawn** (15 April to 30 May)
  - Minimum Release 525cfs (If Required)
- ◆ **Summer Objective: Support River and Lake Recreation**  
(End of Striper Spawn through October 15)
  - **Two Step Minimum Release 500cfs & 400cfs (If Required)**

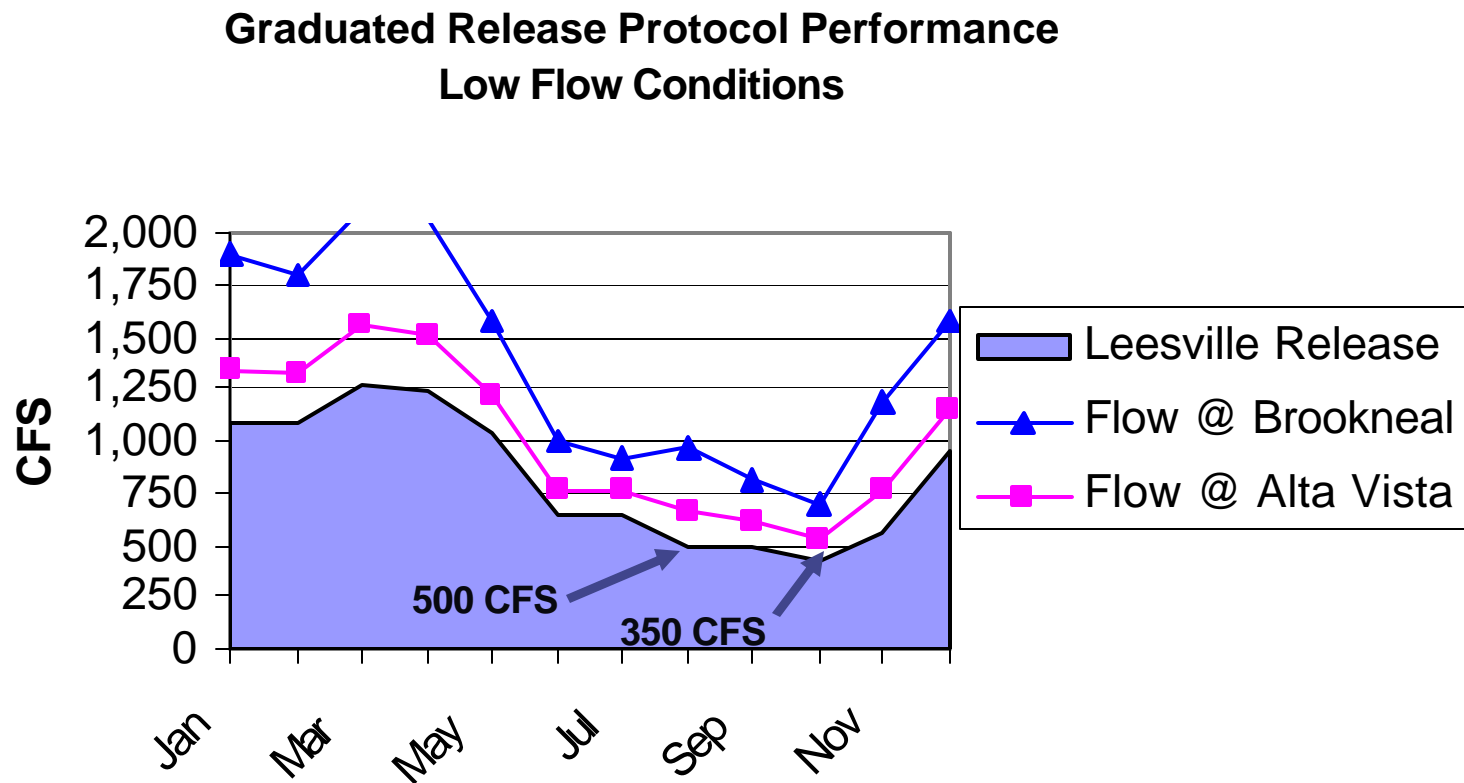
# Historical Monthly Inflows

Expected Low Flow Conditions 1967-2002  
(Factor 1.6 less Evaporation)



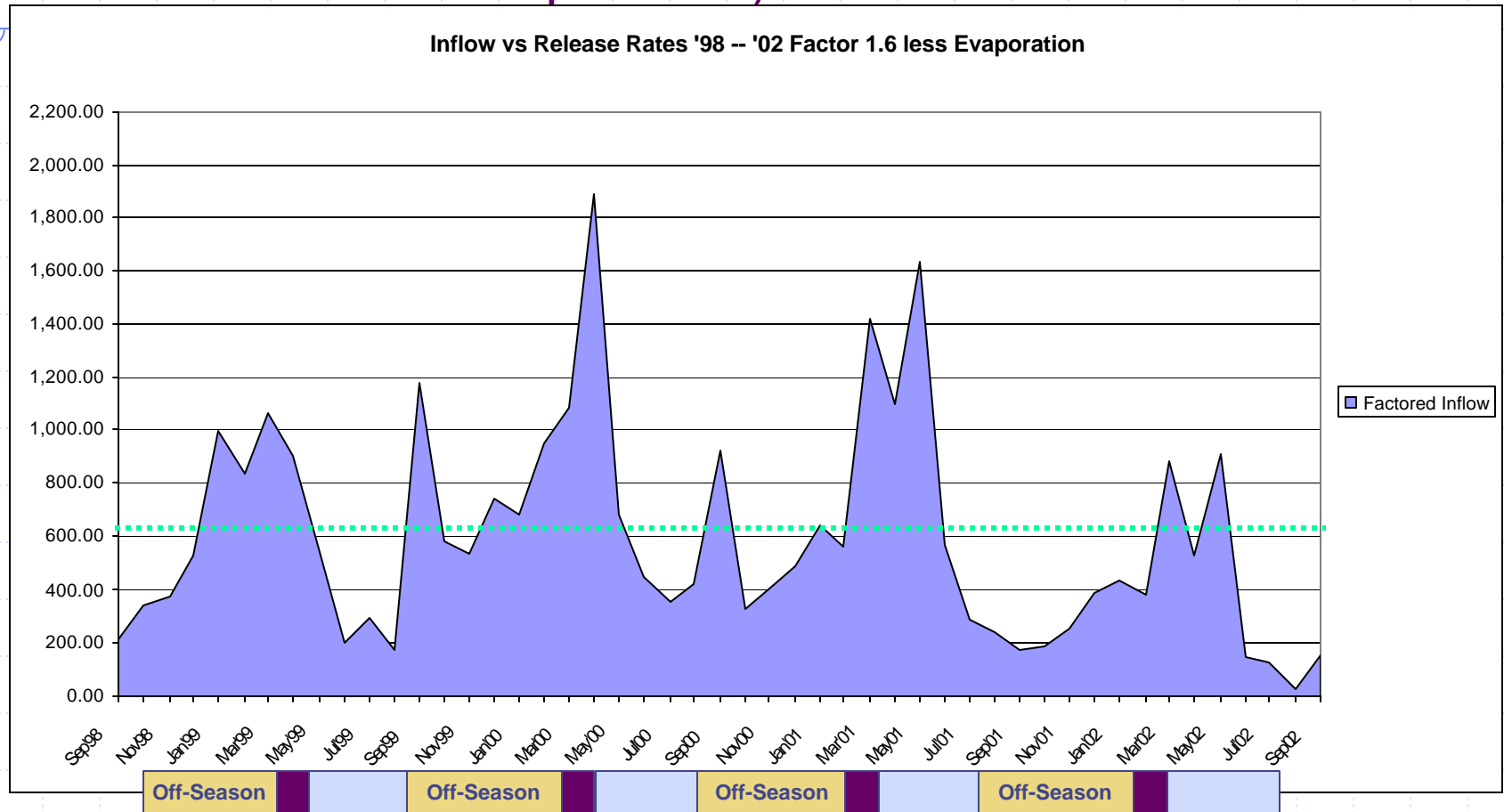
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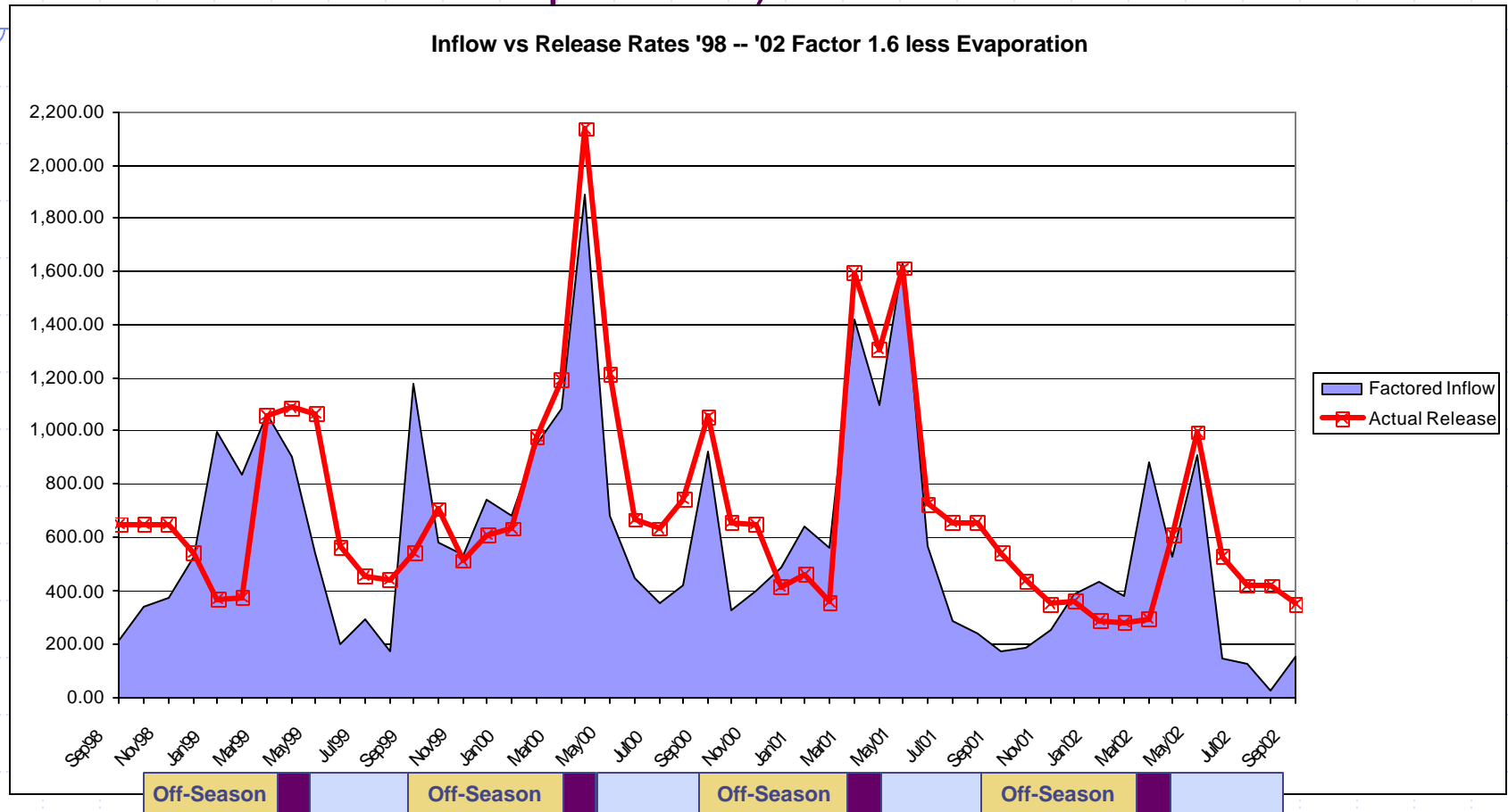
# Inflow vs. Release Protocol 1998 – 2002

(Factored 1.6 less Evaporation)



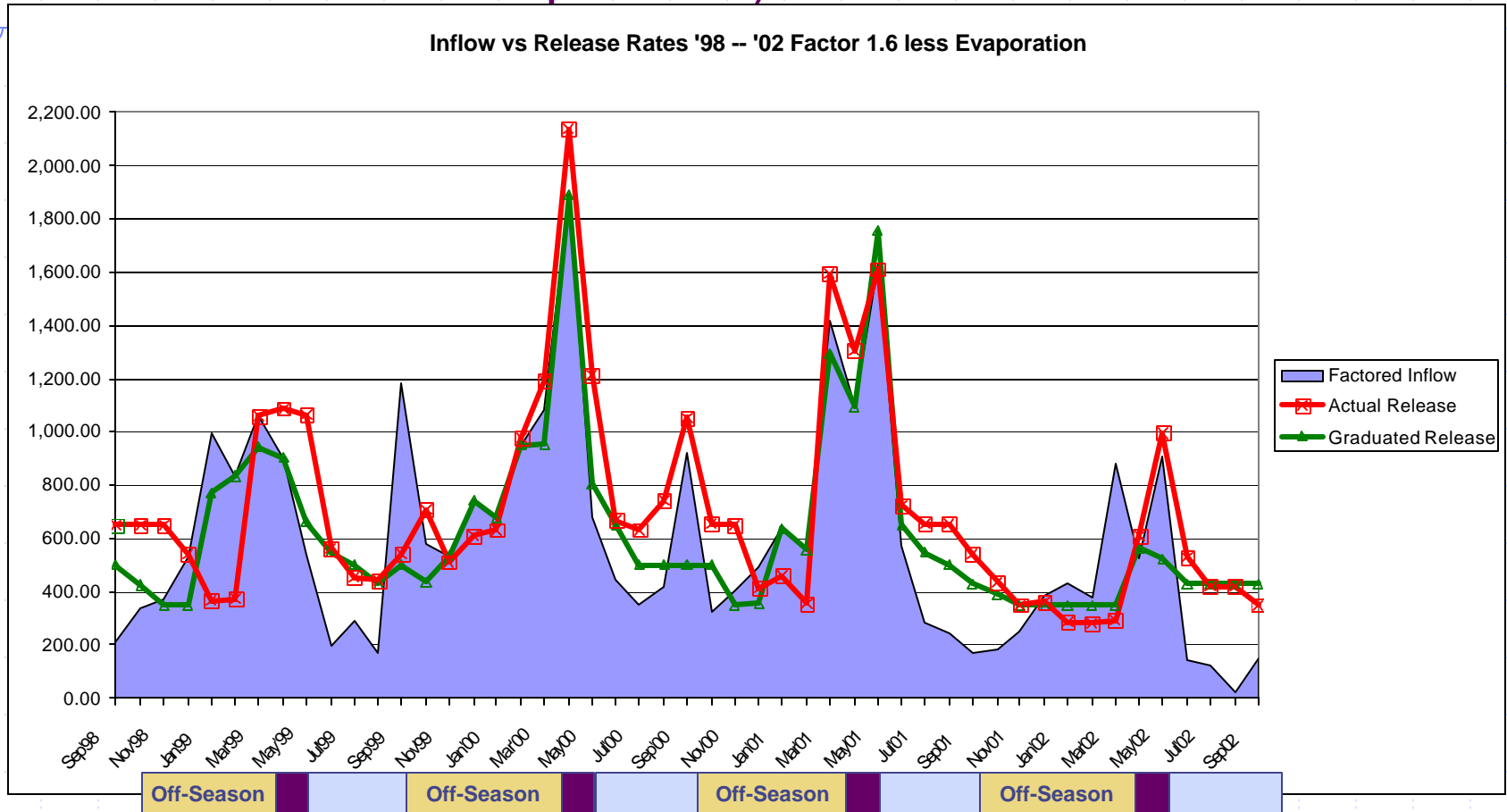
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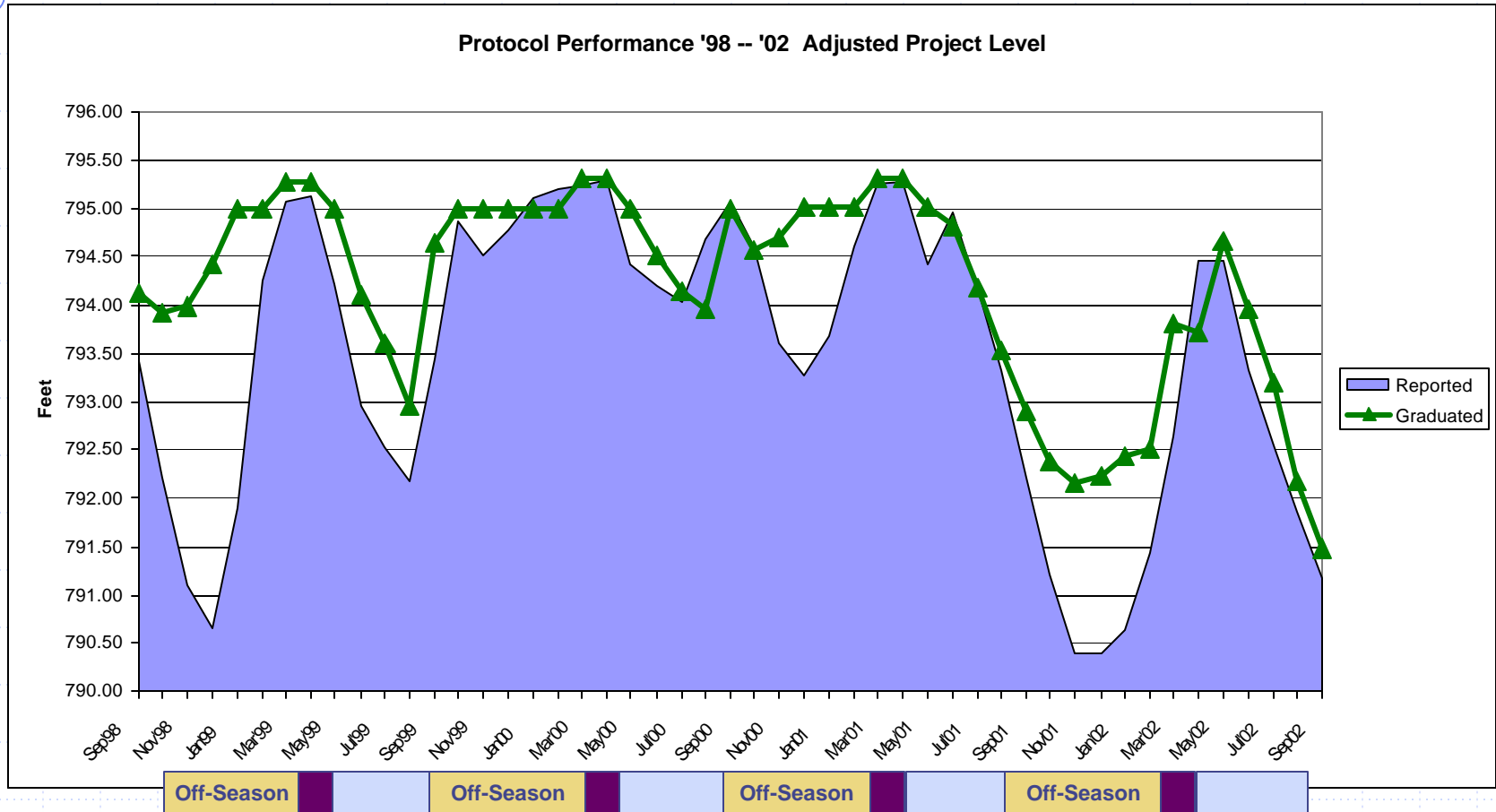
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# Adjusted Project Level 1998 – 2002

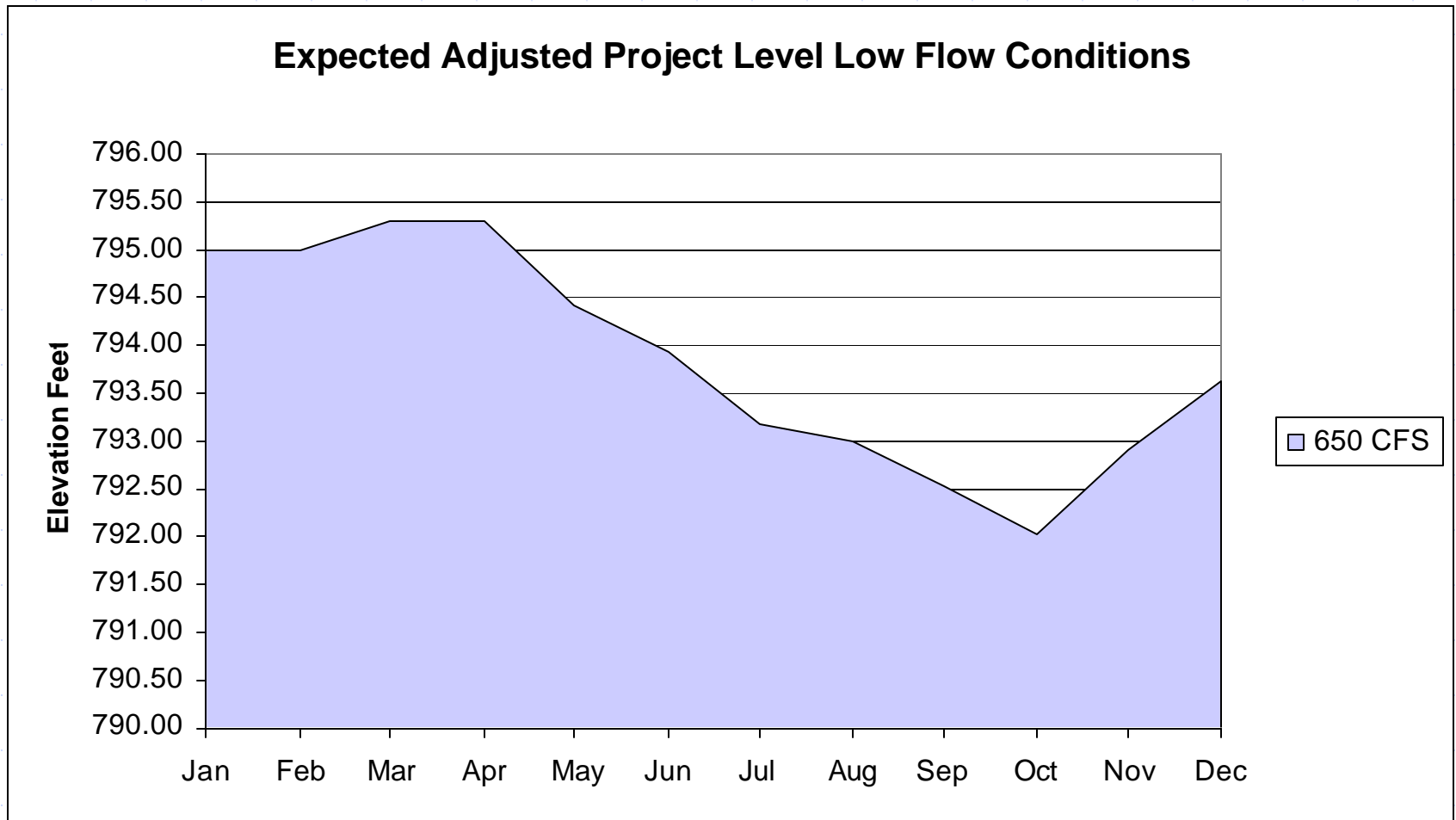
(Factor 1.6 less Evaporation)





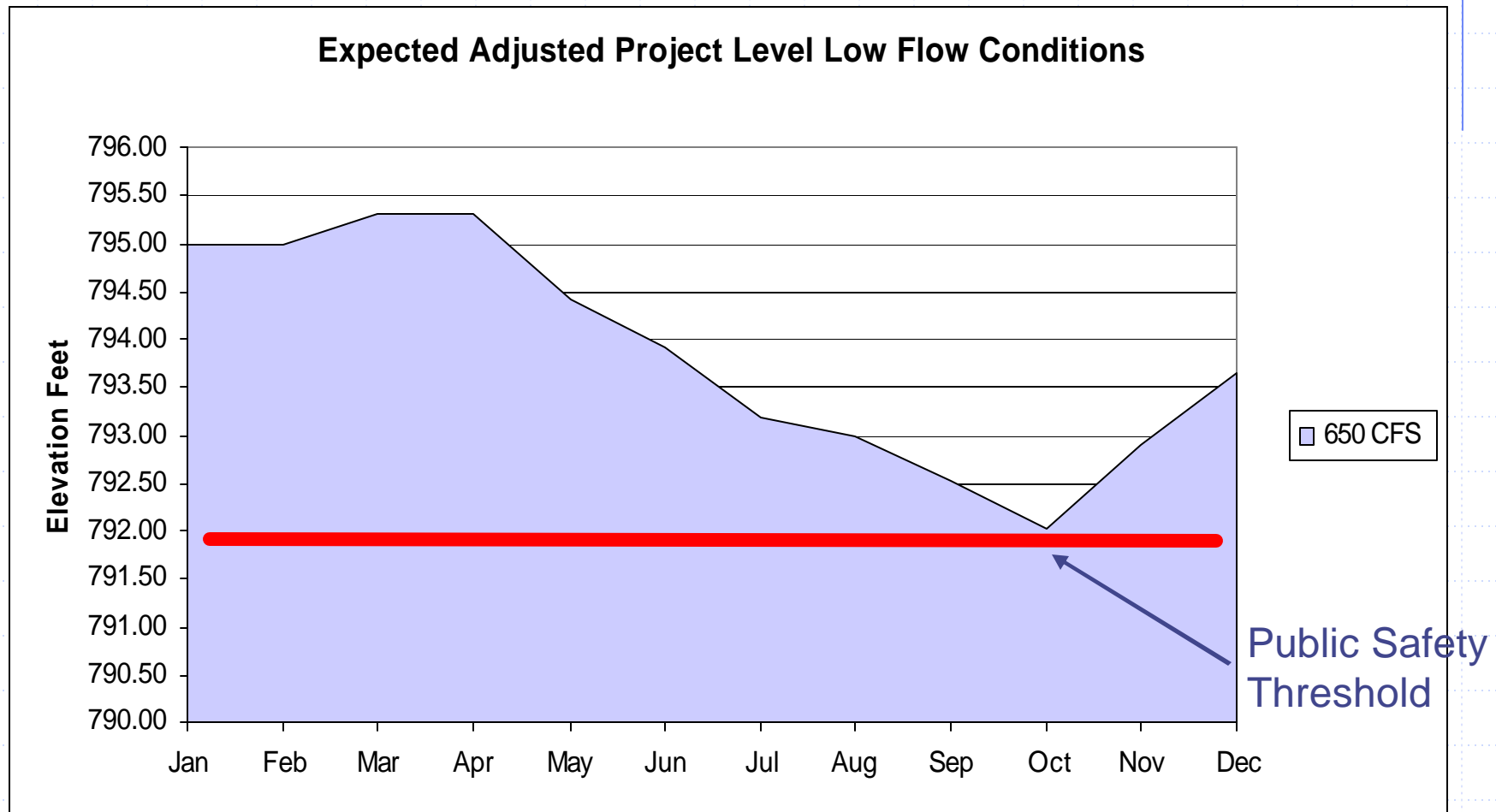
# Performance -- Adjusted Project Level

## Expected Low Flow 1967-2002 Data (Factor 1.6 less Evaporation)



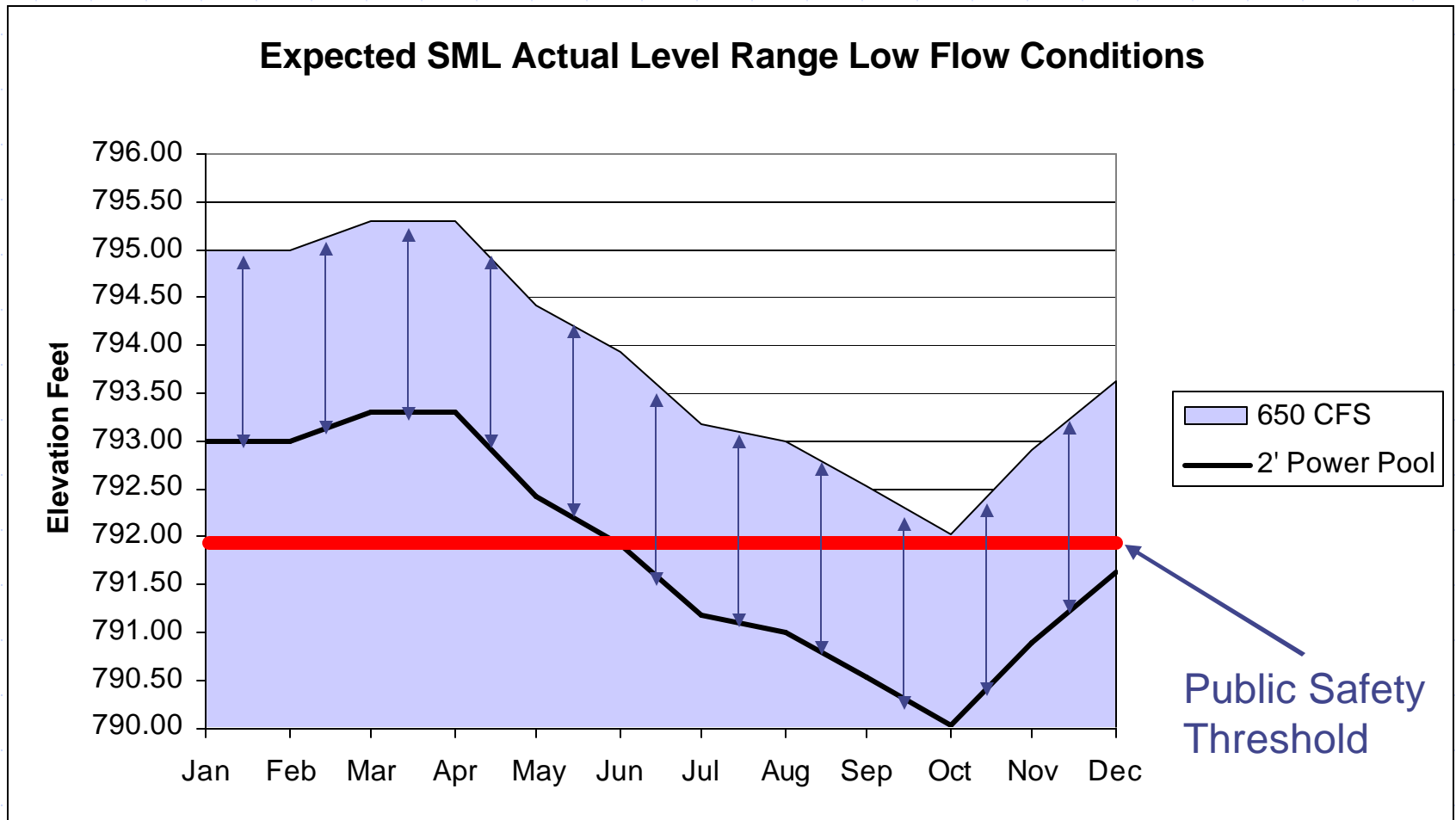
# Performance -- Adjusted Project Level

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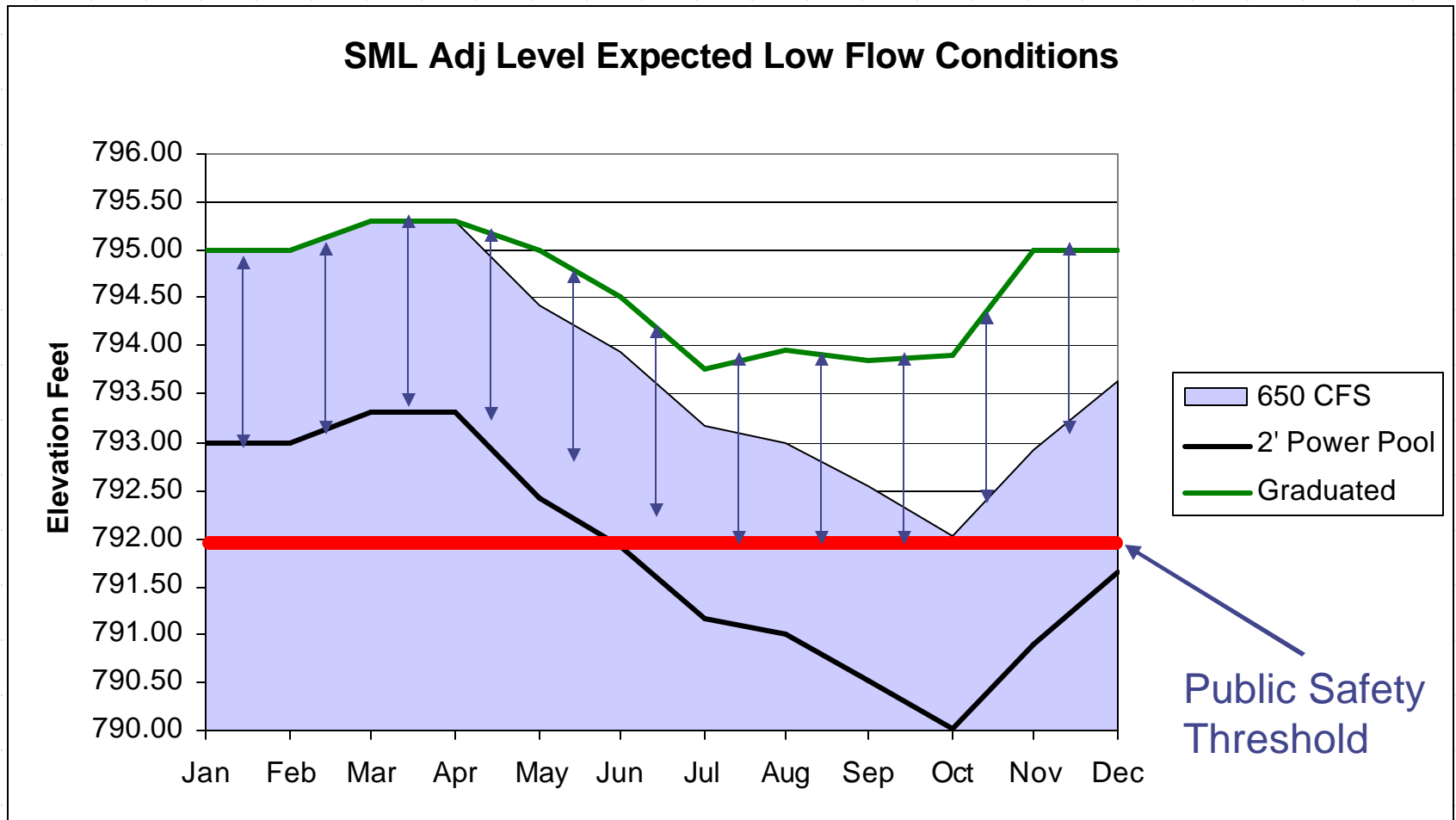
# Performance -- Adjusted Project Level

## Expected Low Flow 1967-2002 Data (Factor 1.6 less Evaporation)



# Performance -- Adjusted Lake Level

Expected Low Flow 1967-2002 Data  
(Factor 1.6 less Evaporation)



# Conclusions

- ◆ Graduated Release Protocol Superior
  - Balanced in Meeting Up & Down Stream Needs
  - Out Performs Current Protocol in Expected Low Inflow Conditions
  - Considers Future Public Water Withdrawals
  - Not All Committee Members in Agreement
    - ◆ Committee Report Published 15 January 2004

# Water Level Issues

- ◆ Public Safety
  - Marine Fire & Rescue
  - Boating (Especially at Night)
- ◆ Navigation
- ◆ Recreational Inconveniences
  - Public Ramps, Private Docks
- ◆ Increased Erosion of Shoreline
- ◆ Increased Weed Growth
- ◆ Loss of Spawning Beds
- ◆ Economic

# State Agency Feedback

***“Not the way we’ve operated in the past ...”***

- ❖ Two Opportunities to Test Graduated Release
  - Mid-June and August 2006
- ❖ Bias towards Downstream Staunton River (Hale Islands)
  - Recreational Releases
  - Clover Power Plant (Dominion Power)
- ❖ No Direct Accountability to the Public
- ❖ Lack of Reliance on Data & Analysis
  - Preliminary Relicensing Study Results Revealing Problems
  - Ignore National Scientific Policy
    - ◆ Hydro Projects should mimic natural river flows

# Recommendations

- ◆ Educate and Involve Lake & River Community
  - TLAC/Lake & Basin Organizations
  - Businesses
  - County & State Governments
- ◆ State Agency Accountability
  - Proactive with Federal & State Officials & Agencies
- ◆ Include Protocol in New AEP License
  - Encourage Testing and Study Prior to 2010 License



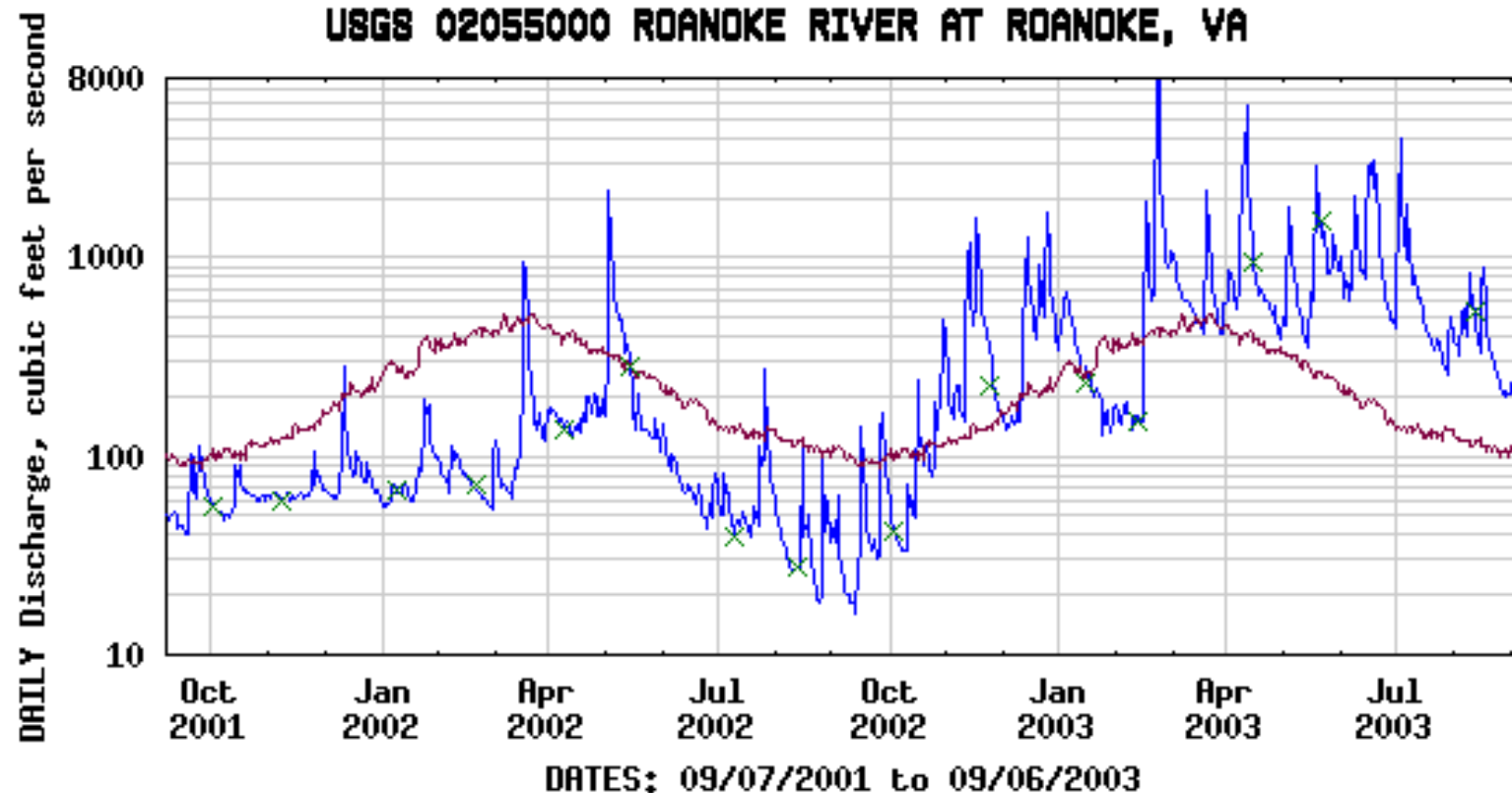


# A Record Drought

Sept. 1998 thru Sept. 2002



# USGS 02055000 ROANOKE RIVER AT ROANOKE, VA



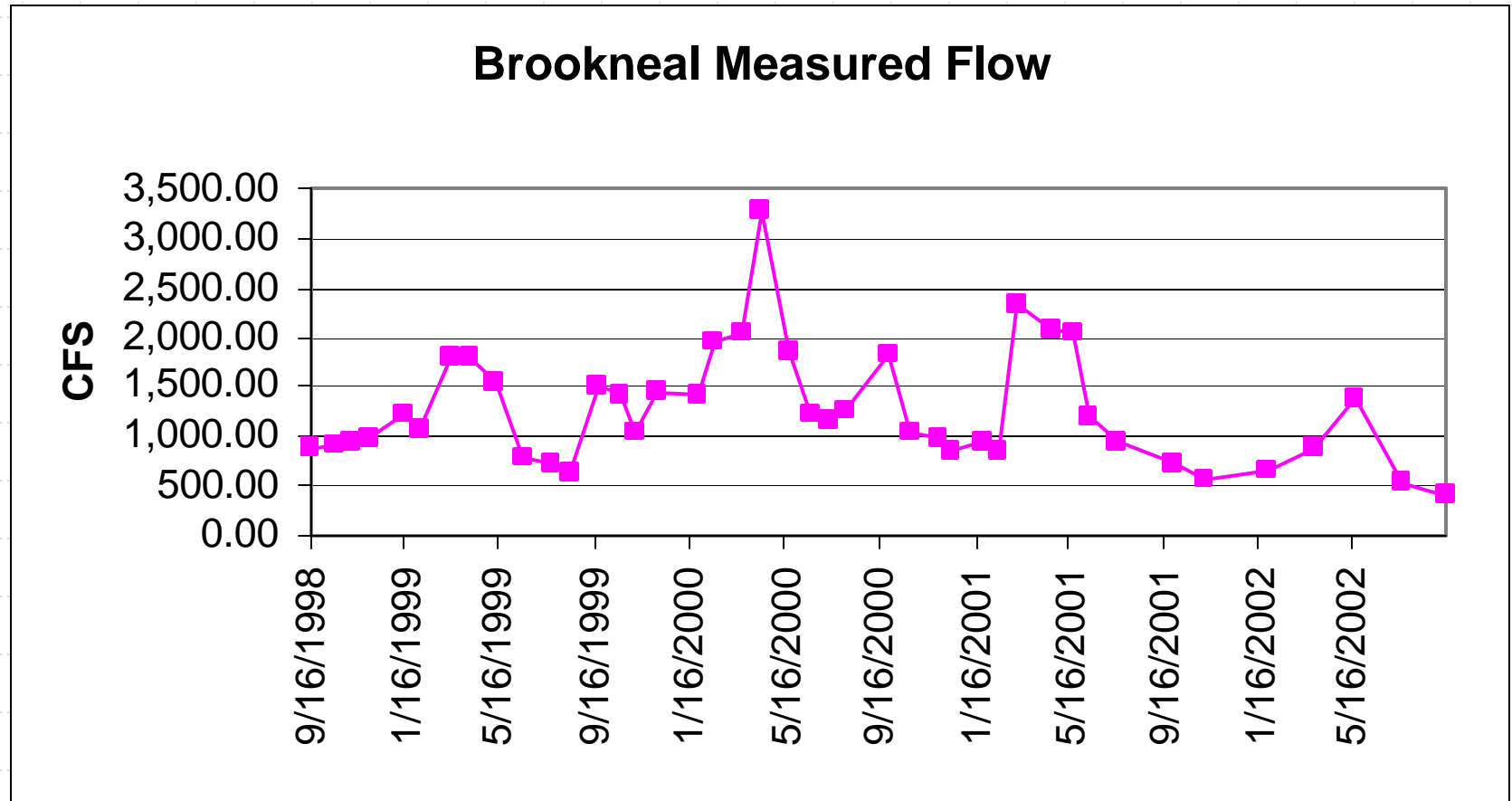
## EXPLANATION

- DAILY MEAN DISCHARGE
- MEDIAN DAILY STREAMFLOW BASED ON 100 YEARS OF RECORD
- × MEASURED Discharge

Provisional Data Subject to Revision

# USGS Measured Flows @ Brookneal

1998 thru 2002



# DEQ DO Content @ Brookneal

*DO More Sensitive to Temperature than Flow Volume*

